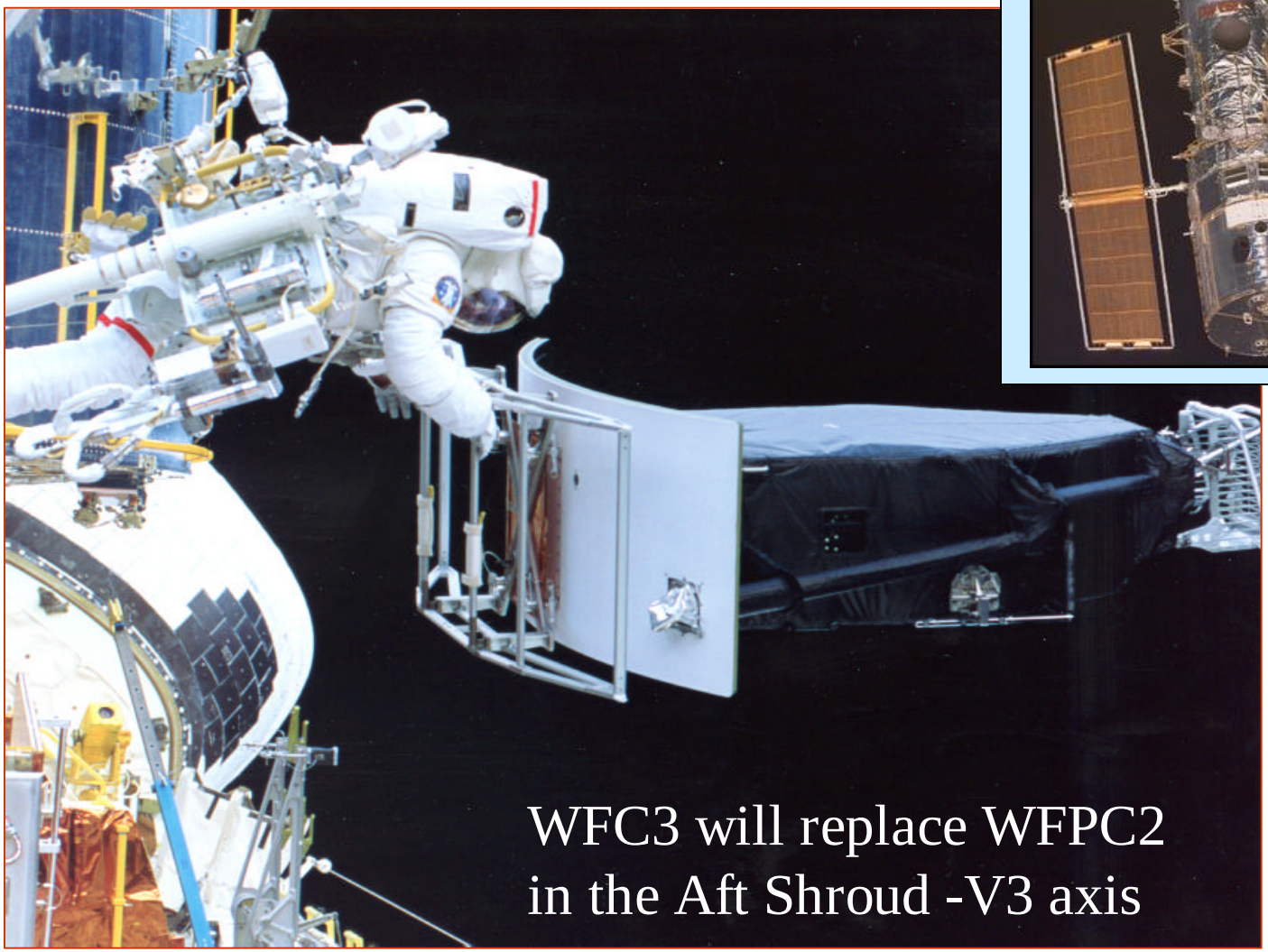
CONFIGURATION OVERVIEW

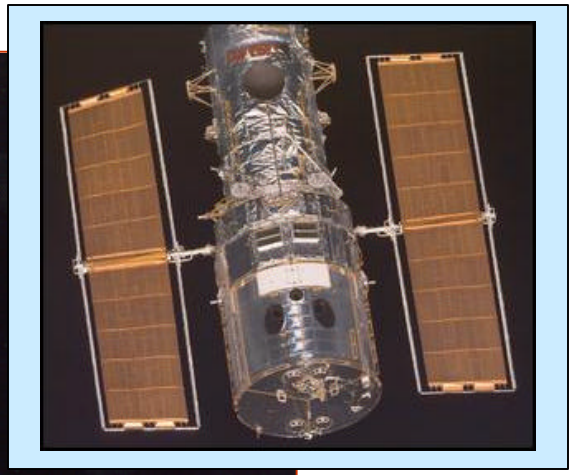
Jim Sneary

Description Outline

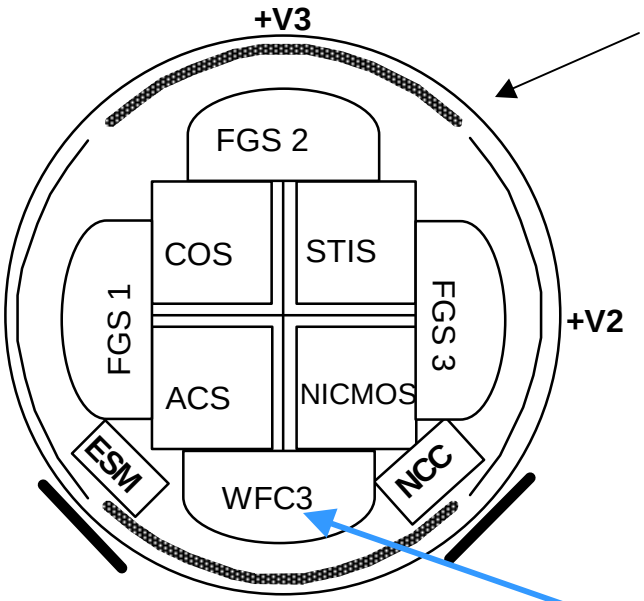
- Location within HST
- System / Subsystems Layout
- Post SRR Changes

Continuing The HST Legacy
Ultimate In-Service Replacement

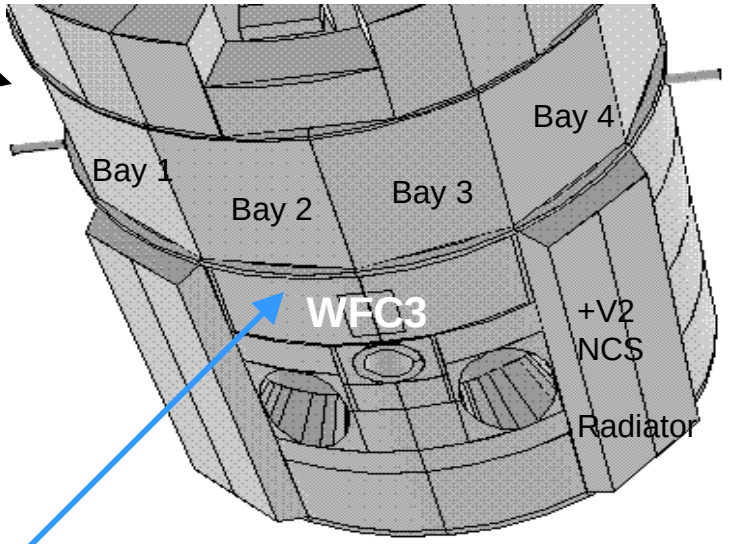




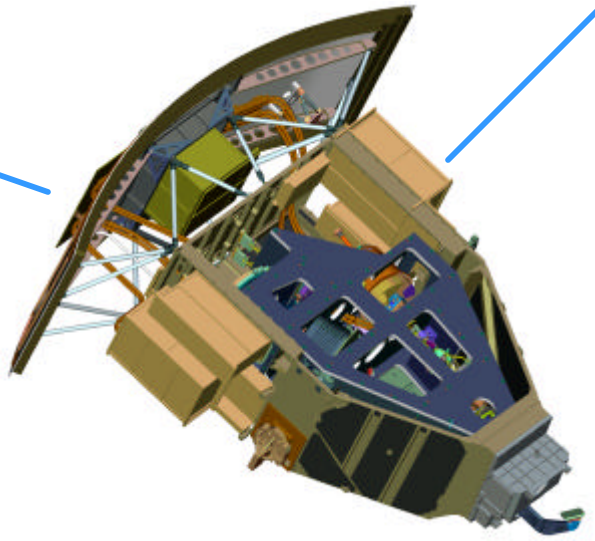
WFC3 Is A Hubble Space Telescope Radial Instrument



HST



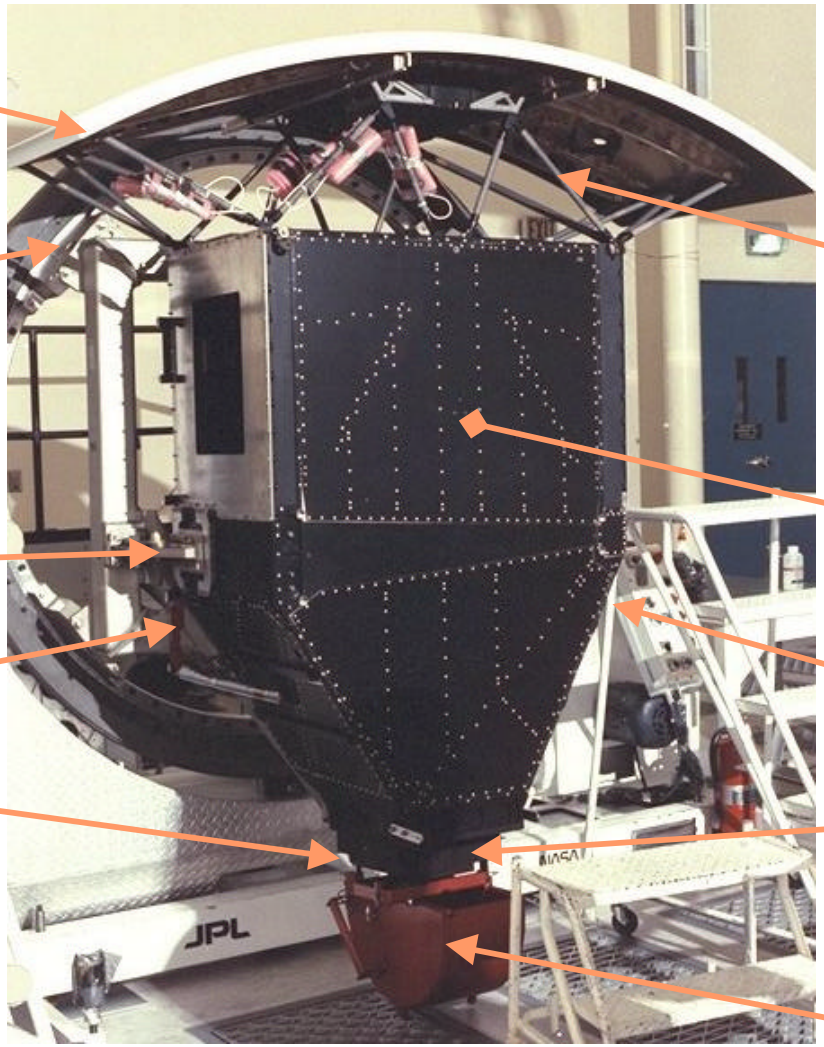
WFC3



WFC3 utilizes the enclosure and radiator of the retrieved WF/PC 1

WFC3 will maintain the same mechanical and electrical interfaces as WFPC2

Numerous WF/PC 1 Components Are Being Reused On WFC3



Main (Detector) Radiator

GSE Rotating Dolly

B-Latch

Guiderails

A-Latch

Radiator Truss Assembly

Enclosure

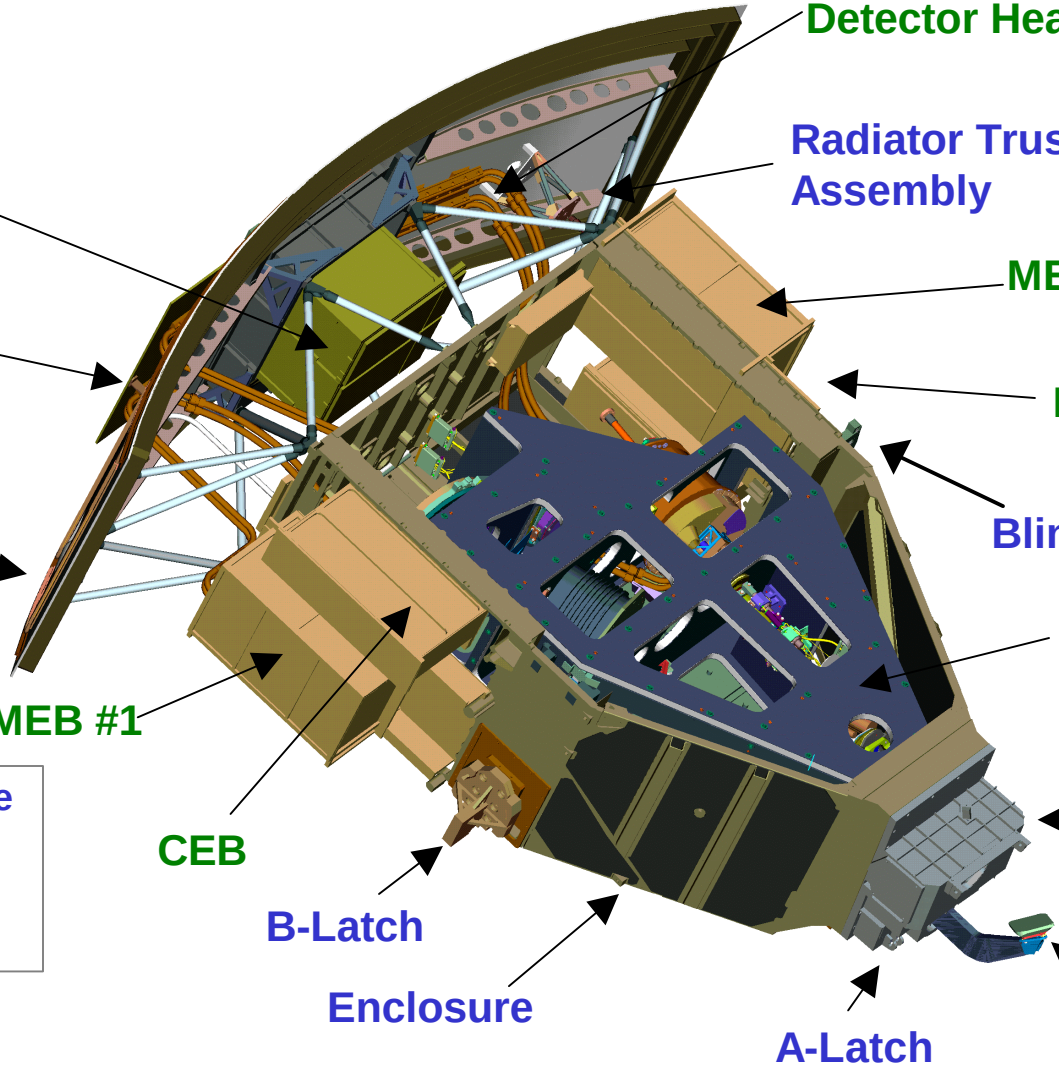
C-Latch (hidden)

Mechanism Cover

GSE Pick-Off Mirror Cover

WF/PC1 H/W reuse items

WFC3 Has Significant Subsystem Heritage

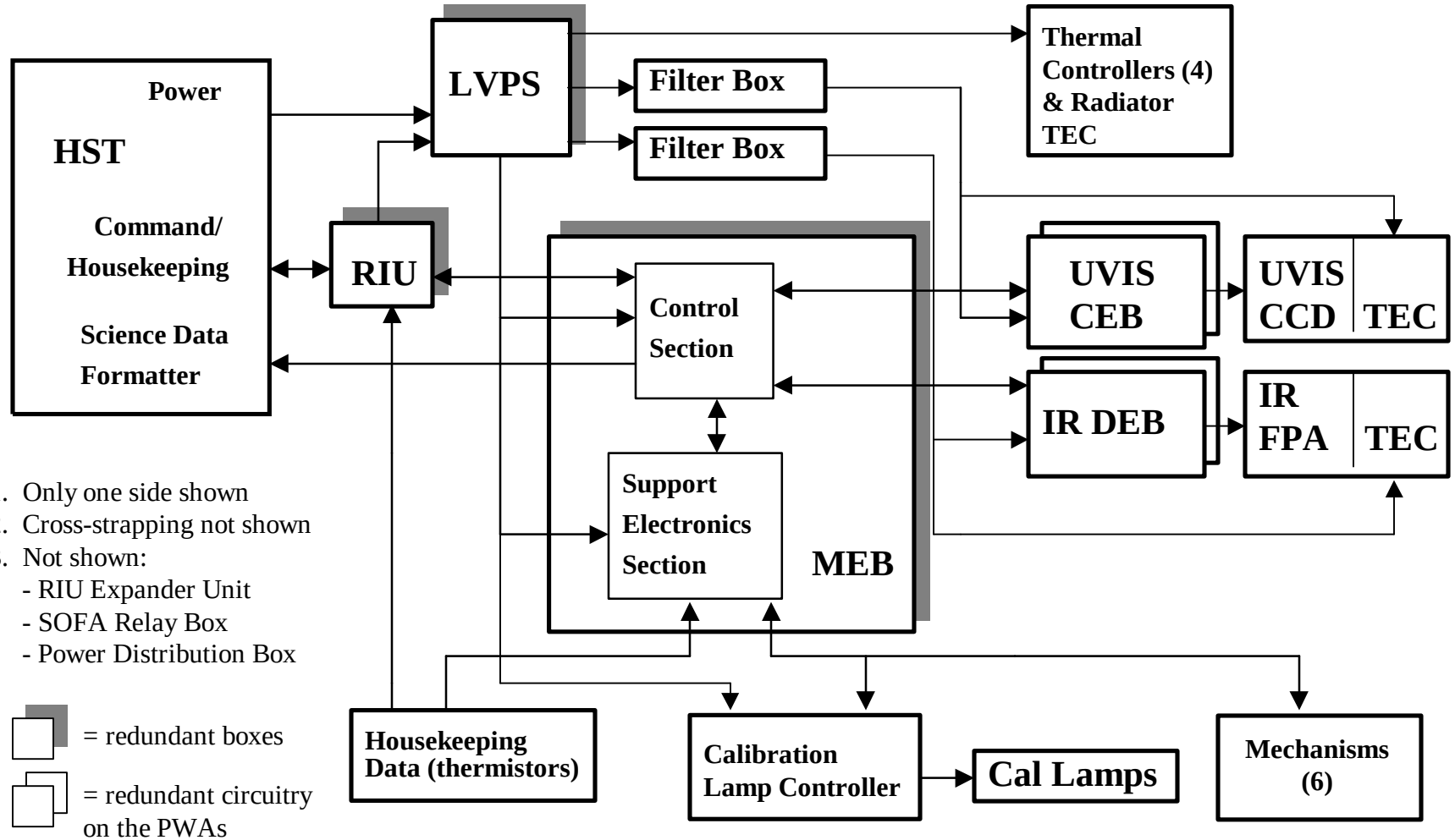


WF/PC I H/W reuse

HST Heritage

New H/W

Electrical Subsystem Simplified Block Diagram

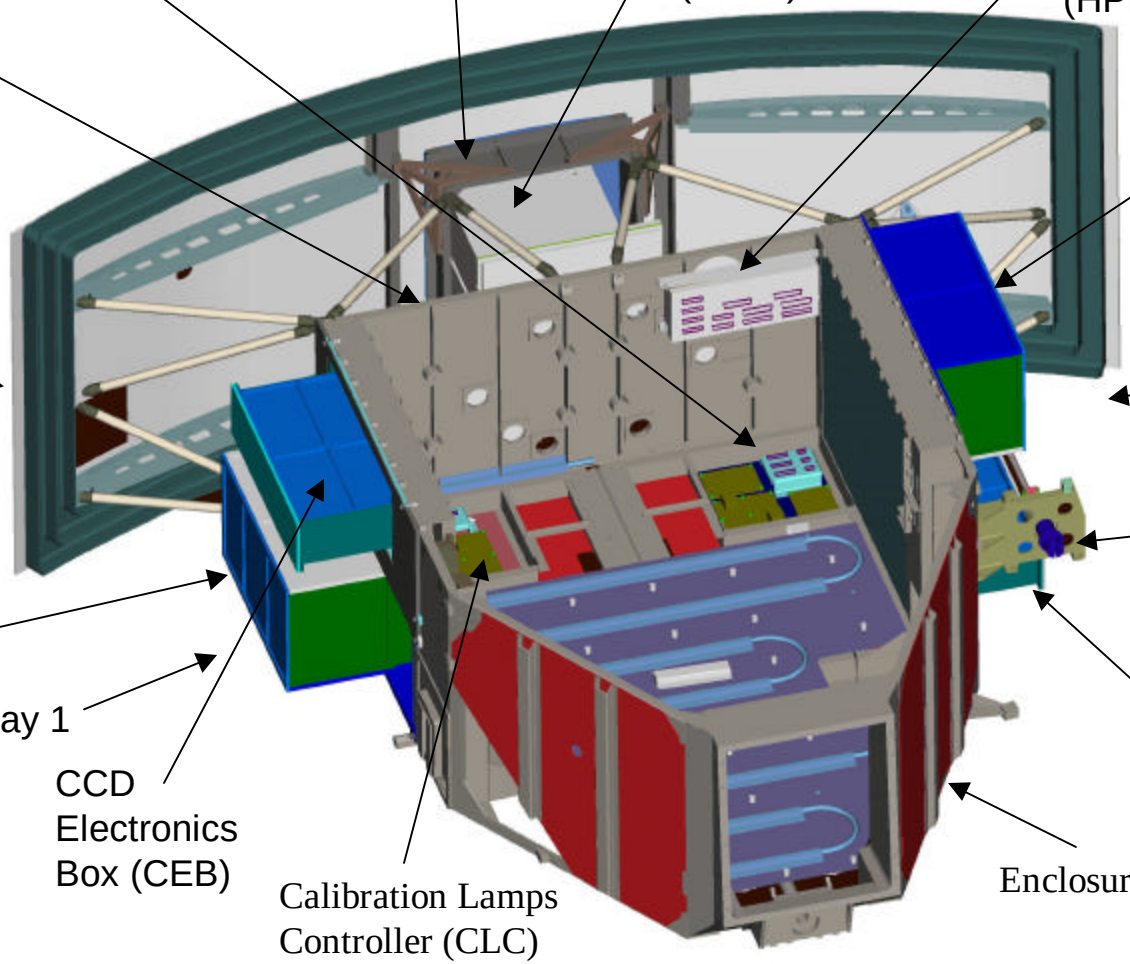


1. Only one side shown
2. Cross-strapping not shown
3. Not shown:
   - RIU Expander Unit
   - SOFA Relay Box
   - Power Distribution Box

= redundant boxes

= redundant circuitry on the PWAs

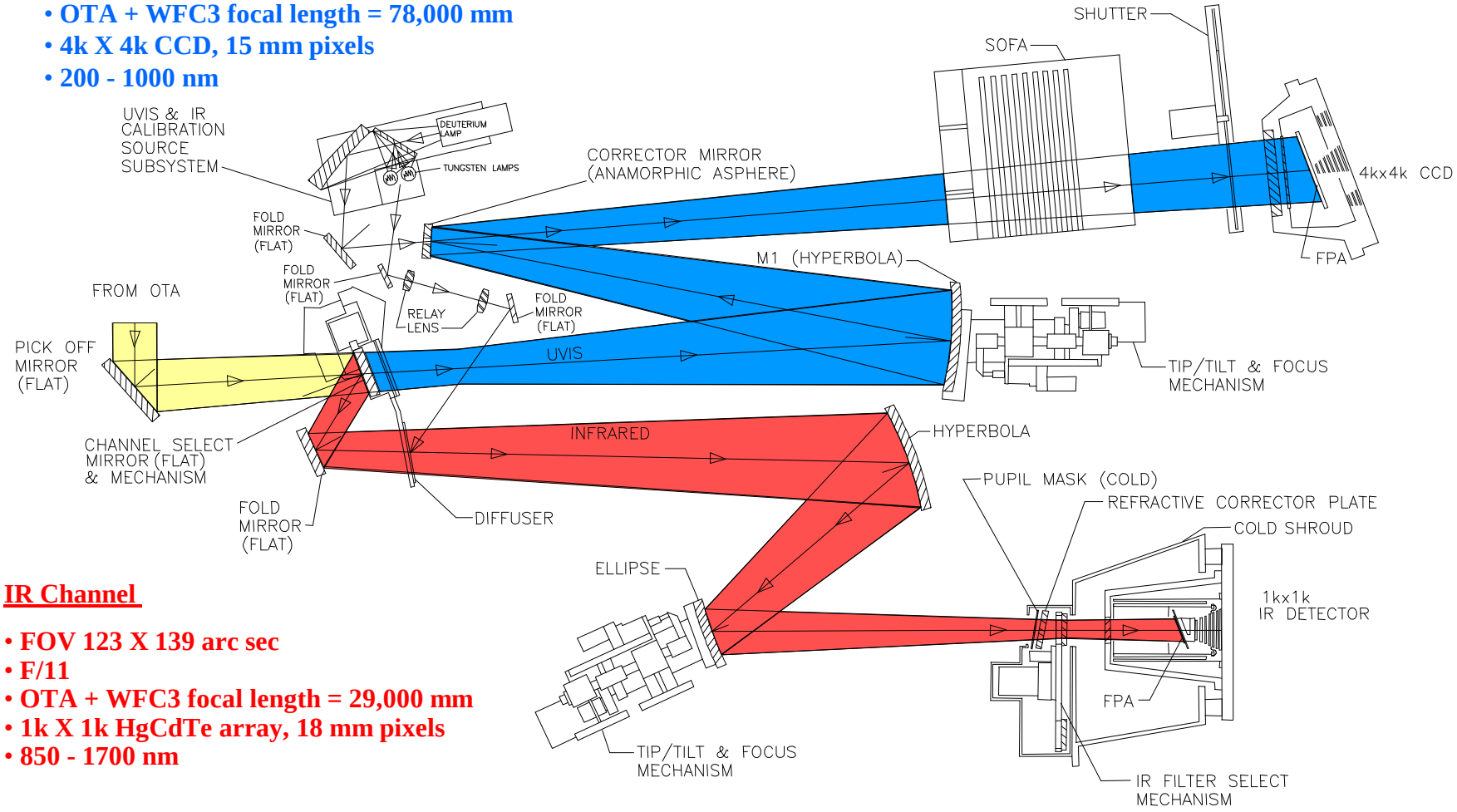
Electronics Locations On WFC3



Wide Field Optical Diagram

UVIS Channel

- **FOV 160 X 160 arc sec**
- **F/31**
- **OTA + WFC3 focal length = 78,000 mm**
- **4k X 4k CCD, 15 mm pixels**
- **200 - 1000 nm**



IR Channel

- **FOV 123 X 139 arc sec**
- **F/11**
- **OTA + WFC3 focal length = 29,000 mm**
- **1k X 1k HgCdTe array, 18 mm pixels**
- **850 - 1700 nm**

Highlights Of Post-SRR Changes

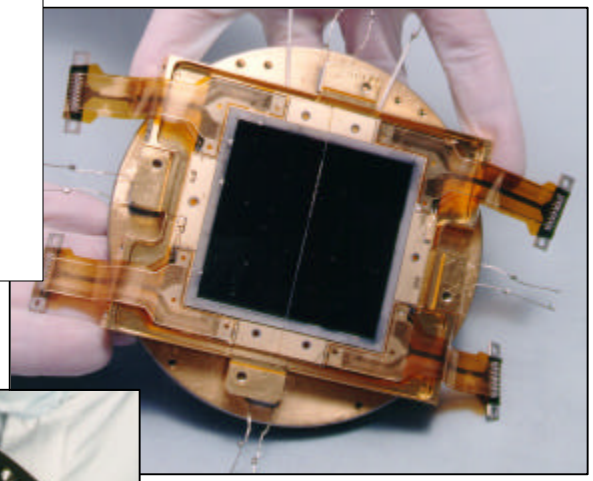
- Reflective IR optical configuration changed to a refractive system
  - Incorporation of a refractive corrector plate (RCP) and an optimized ‘co-located’ cold stop
  - Benefit is overall instrument throughput improvement from 61 to 85 %
- Both detector focal planes (UVIS and IR) are mounted at an angle to optic axis to account for off-axis optical prescriptions
- Numerous packaging iterations for locations of mechanisms and electronics boxes.
- Down-selected to Marconi CCD for ;
  - Noise performance and considerations for coating / QE stability and CTE

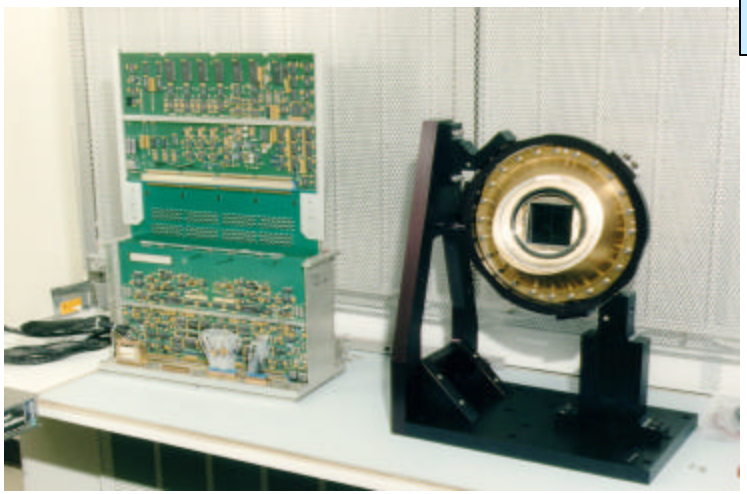
UVIS Channel Detector

- **Format: 2 x 2Kx4K CCDs**
- **Pixel size: 15 mm**
- **Field of View: 160x160 arcsec**
- **Bandpass: 200 to 1000 nm**
- **Read Noise: < 4 e- rms**
- **QE > 60% for 300 to 700 nm**
- **Charge Transfer Efficiency: > 0.99999 (start of life)**
- **Dark current: < 15 e-/pix/hr**

2k x 4k CCD

Two per assembly

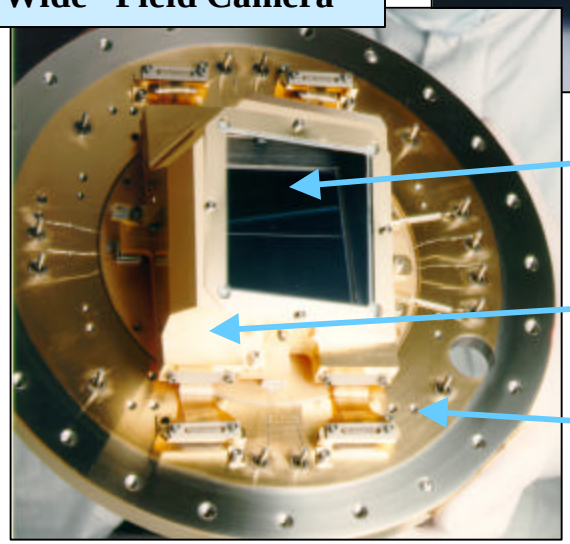




CEB Electronics

Enclosure

Hardware from ACS Wide Field Camera



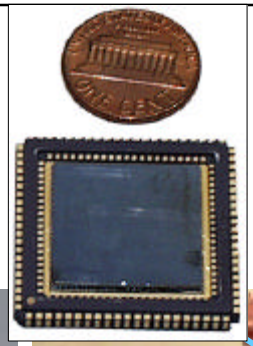
Focal Plane

Upper Radiation Shield

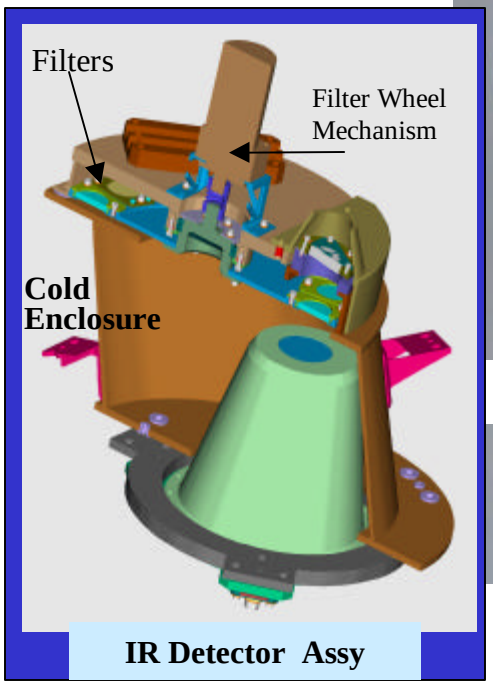
Base Plate

IR Demo Hardware
- Designed, Fabricated And Tested -

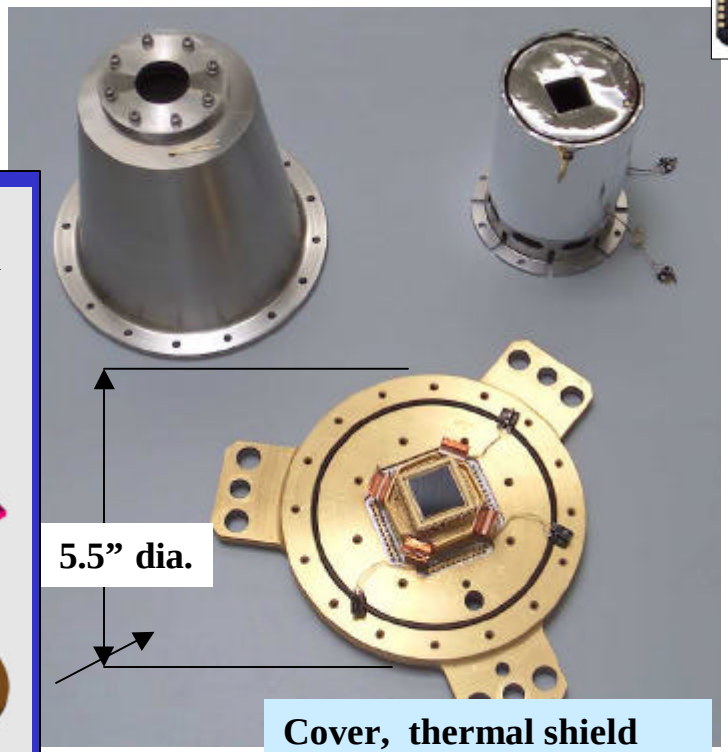
- Format: 1Kx1K HgCdTe/Silicon mux
- Pixel size: 18 um
- Field of View: 130x130 arcsec
- Bandpass: 850 to 1700 nm



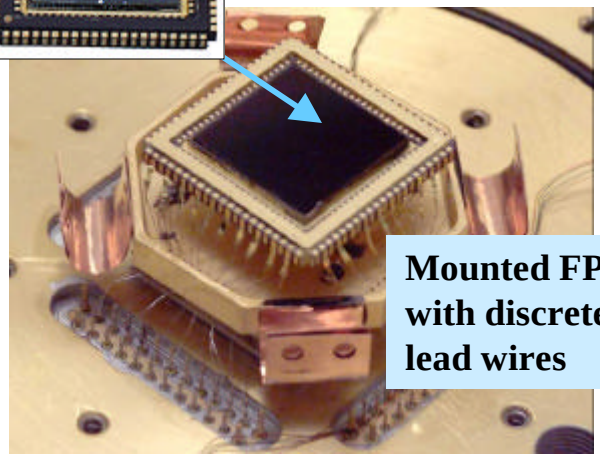
One
1 K x 1 K FPA
per unit



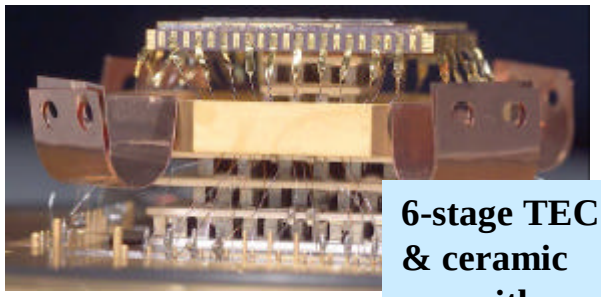
IR Detector Assy



Cover, thermal shield and baseplate

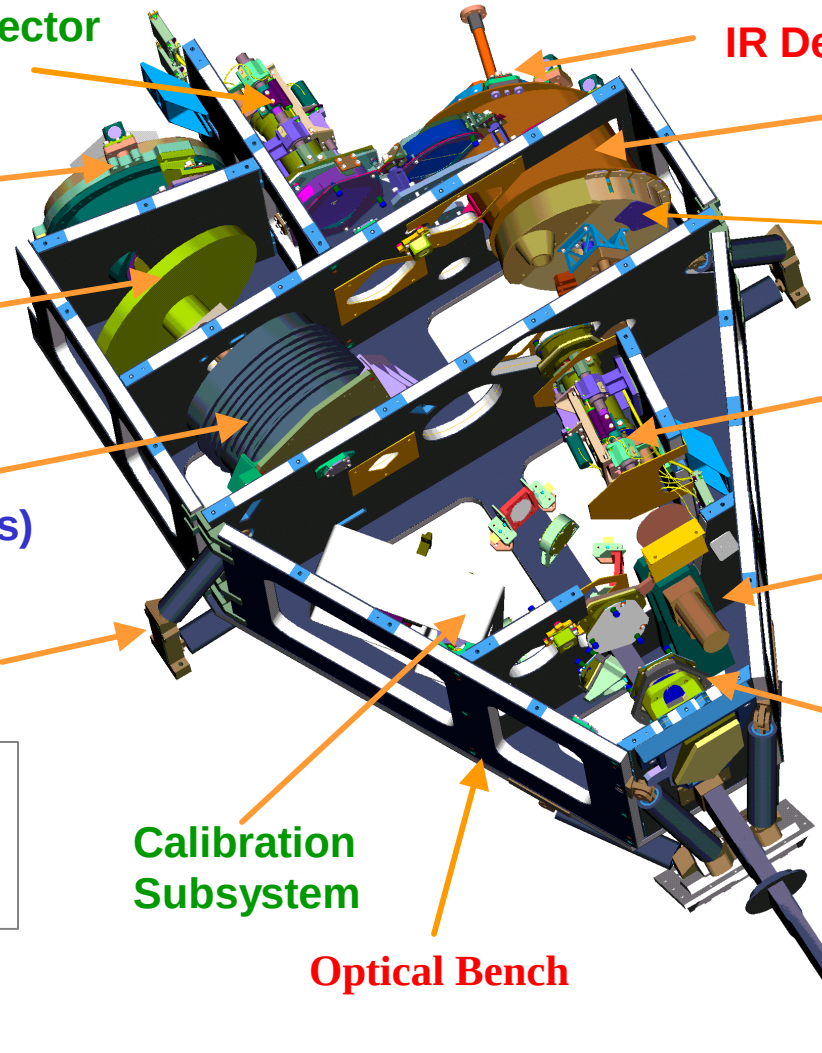


Mounted FPA with discrete lead wires



6-stage TEC & ceramic cup with Cu straps

Optical Assembly With Top Panel Removed



UVM1 & Corrector Mechanism

UVIS Detector

UVIS Shutter

SOFA (UVIS Filters)

Athermalized Strut System

WF/PC I H/W reuse

HST Heritage

New H/W

Calibration Subsystem

Optical Bench

IR Detector

IR Cold Enclosure RCP

IR Filter Wheel

IRM2 & Corrector Mechanism

Channel Select Mechanism

IR Fold Mirror

Pickoff Mirror

WFC3 Thermal Configuration